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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/544,615	04/06/2000	KATSUYA SAITO	0145-148	9124

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EXAMINER

ROY, SIKHA

ART UNIT PAPER NUMBER

2879

DATE MAILED: 09/30/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/544,615

Applicant(s)

SAITO ET AL.

Examiner

Sikha Roy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a) in no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 16 July 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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DETAILED ACTION

The Amendment, filed on July 16, 2002, has been entered and acknowledged by the Examiner.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent 5,861,714 to Wei et al.

1 Wei et al. disclose (column 8 lines 64-67, column 9 lines 1-10, Figs. 2 and 6) the lamp seal 8b comprising of zones of functionally gradient material (column 4 lines 40,41) achieved by mixing different amounts of electrically non-conductive (alumina) and electrically conductive (tungsten or molybdenum) material and a lead bar (molybdenum tube) 7b. The layer (zone) 11a of the seal at one end is non-conductive (innermost ring having 0% tungsten) and the layer 11g at the opposite end is conductive (the outermost ring having 40-43 vol.% of tungsten). Wei et al. further disclose (column 15 lines 1-7) the lead bar passes through a cylindrical hole in the multi-layer seal entering in one end and coming out the other end.

Regarding claim 1 Wei et al. disclose the invention except for the limitation of the range of the proportion of the conductive material at a point of attachment of the lead bar to the functionally gradient material no less than 0.6 vol% and no more than 39

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vol.%. Wei et al. disclose this specially designed seal with graded electrically non-conductive and conductive multilayers eliminates cracking by reducing thermal stresses arising from thermal expansion mismatch which is the same reason for using functionally gradient material in the seal disclosed by the applicants. It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the range of the proportion of the conductive material at a point of attachment of the lead bar to the functionally gradient material no less than 0.6 vol% and no more than 39 vol.%, since optimization of workable ranges is considered within the skill of the art.

Regarding claim 2 Wei et al. disclose (column 6 lines 22-35) the values of the diameter C (= 0.9mm) of the cylindrical feed through, the outer diameter d (= 0.6mm) of the lead bar and the outer diameter D (=3.0mm) of the functionally gradient material which are known as typical dimensions of cermet plug. These values satisfy the condition $1.2d < C < 0.6D$ as claimed by the applicants.

Regarding claim 2, Wei et al. disclose the claimed invention except for the limitation of the diameter C being equal to $1.2d$ or $0.6D$. It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. It would have been obvious to one having ordinary skill in the art at the time the invention was

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made to provide the condition $1.2d \leq C \leq 0.6D$, since optimization of workable ranges is considered within the skill of the art.

Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent 5,861,714 to Wei et al. et al. in view of U. S. Patent 5,742,123 to Nagayama.

Regarding claims 3 and 4, Wei et al. do not exemplify the cylindrical hole of the lead bar expanding in a tapered form from the point of attachment toward the non-conductive end, the thickness of the functionally gradient material layer at the non-conductive end being less than that at the other end which is the point of attachment and the outside diameter of the functionally gradient material at the non-conductive end being smaller than that at the point of attachment.

Nagayama in the analogous art of sealing structure for light emitting bulb assembly disclose (column 23 lines 48-66, column 24 lines 1-9 Figs 16, 19) a lamp seal 303 with a multi-layer structure composed of plurality of layers 303_1 at the non-conductive end and 303_n at the point of attachment. The hole 310 expands in a tapered form towards the non-conductive end, the thickness of layers increases progressively from the non-conductive (innermost layer) end towards the outermost layer at the point of attachment. It is clearly evident from Fig. 16 the outside diameter of the functionally gradient material at the non-conductive end (303_1) is smaller than that of the layer at the point of attachment (303_n). It is further noted (column 24 lines 4-9) that this structure of the lamp seal prevents the layers at the non-conductive end from contacting the lead

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bar (electrode rod) and is effective in reducing stress that are developed when the layers are thermally expanded .

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to modify the lamp seal of Wei et al. by the hole expanding in a tapered form from the point of attachment toward the non-conductive end, the thickness of the functionally gradient material layer at the non-conductive end being less than that at the point of attachment and the outside diameter of the functionally gradient material at the non-conductive end being smaller than that at the point of attachment as taught by Nagayama for preventing the layers at the non-conductive end from contacting the lead bar and reducing stress that are developed when the layers are thermally expanded.

Response to Arguments

Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

In response to applicants' argument that Wei et al. disclose mutpartplug having structure comprising axially aligned parts with different coefficients of thermal expansion not electrical conductivity the Examiner respectfully disagrees. The Examiner notes that Wei et al. clearly disclose (column 4 lines 37-41) the composition of parts in the seal differ in the proportion of metal added to non-conductive alumina which inherently results in difference in electrical conductivity of different layers.

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Conclusion


The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U. S. Patent 6,194,832 to Juengst and JP 10172514 A disclose lamp seals with functionally gradient material.

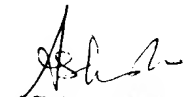
Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikha Roy whose telephone number is (703) 308-2826. The examiner can normally be reached on Monday-Friday 8:00 a.m. – 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D. Patel can be reached on (703) 305-4794. The fax phone number for the organization is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


Sikha Roy
Patent Examiner
Art Unit 2879


ASHOK PATEL
PRIMARY EXAMINER